DECLARATION

I, Ginny Kang, a Korean citizen of #906, Sung-bo Apartment, Yeoksam-dong, Gangnam-gu, Seoul, Korea do hereby solemnly and sincerely declare as follows:

1. That I am well acquainted with the English and Korean languages.
2. That the following is a correct translation into English of Korean Patent Application No. 2002-86841 filed on December 30, 2002, and I make the solemn declaration conscientiously believing the same to be true.

Seoul, June 1, 2006

Ginny Kang

[DOCUMENT] Application for Patent

[CLASSIFICATION] Patent

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[TITLE OF THE INVENTION-KOREAN] 동력전달장치

[TITLE OF THE INVENTION-ENGLISGH] Apparatus for power transmission

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[PURPOSE] I, hereby, submit the present application for the Patent under the Article 42 of the Patent Law, and request examination under the Article 60 of Patent

Law. Attorney Hong-sik JEONG (seal)

[Official Fee]

[Basic fee]	16	pages	\ 29,000
[Additional fee]	0	pages	\ 0
[Claiming Priority Right]	0	case	\ 0
[Filing Request For Examination]	5	claims	\ 269,000
[Total]			\ 298,000

[Documents] 1. One copy of Abstract, Specification (& drawings)

[ABSTRACT]

[Abstract of the disclosure]

A power transmitting apparatus connecting a first gear trams provided on a first gear supporting frame, and a second gear train provided on a second gear supporting frame neighboring the first supporting frame, the power transmitting apparatus comprising: an idle gear provided on the first gear supporting frame to connect to the first gear train; a swing arm in a V-configuration, coaxially formed with the idle gear and rotatable about the idle gear; a pair of swing gears rotatably formed on both ends of the swing arm, and selectively connected with the second gear train when the gear arm rotates. Even when the assembling tolerance occurs between the gear supporting frames, the tolerance can be offset by the swing gear provided to the swing arm. Accordingly, problems associated with irregular distance between axes, such as escape of power transmitting parts, gear wearing-outs and deteriorated transmission efficiency, can be prevented.

[The main figure]

FIG. 3

[Search terms]

Power transmitting apparatus, gear train swing gear, arm gear

[SPECIFICATION]

[The title of the invention]

Apparatus for power transmission

[The brief description of the drawings]

FIG. 1 is a schematic view showing an idle gear connecting gear trains of a first gear supporting frame with a second gear supporting frame;

FIG. 2 is a perspective view showing a power transmitting apparatus according to the present invention connected with the gear train;

FIG. 3 is a perspective view showing the main part of FIG. 2;

FIG. 4 is an exploded perspective view of a power transmitting apparatus according to the present invention;

FIG. 5 is a side view showing the power transmitting apparatus according to the present invention rotating in a forward direction; and

FIG. 6 is a side view showing the power transmitting apparatus according to the present invention rotating in a reverse direction.

<Description of the reference numerals in the drawing>

10: swing arm 11: swing gear engaging protrusion

12: separation preventing protrusion 20: idle gear

30: swing gear 40: elastic member

100: power transmitting apparatus

[Detailed description of the invention]

[Object of the invention]

[The field of the invention and the prior art]

The present invention relates to a power transmitting apparatus, and more particularly, to a power transmitting apparatus having a swing gear capable of improving problems such as escape of power transmitting parts, gear wearing-outs, deteriorated

transmission efficiency due to irregular distance between axes.

A mechanic system having one or more gear trains to transmit power of a driving source to needing units generally distributes the driving power using a predetermined power transmitting apparatus, rather than using separate driving sources for each of the gear trains. Because driving sources are not separately required, the mechanic system can be provided with more economic price and compact size.

However, because it is difficult to install all of the gear trains on one frame, and especially when a complex of gear trains is used, separate gear supporting frames are employed. In this case, idle gears can be provided between the gear supporting frames to distribute the power.

FIG. 1 schematically showing the idle gear connecting the gear trains to the power transmitting apparatus.

In other words, the power from the driving motor 1 is transmitted to the idle gear 3 via the motor gear 2, and the power reaching the idle gear 3 is transmitted to the first and the second gear trains 6 and 7 of the first and the second gear supporting frames 4 and 5 to drive the units on the respective gear trains.

The problem is that the distance d between axes of the first and the second gear supporting frames 4 and 5 can be varied due to assembling tolerances of the supporting frames, which causes escape of power transmitting parts, gear wearing-outs, and deteriorated transmitting efficiency.

[Technical object of the invention]

The present invention has been made in consideration of the above problems, and therefore, it is an object of the present invention to provide a power transmitting apparatus of an improved structure which is not influenced by the variance of distance between axes due to assembling tolerances.

[Construction and operation of the invention]

The above aspects and/or other features of the present invention can substantially be achieved by providing a power transmitting apparatus connecting a first gear trams provided on a first gear supporting frame, and a second gear train provided on a second gear supporting frame neighboring the first supporting frame, the power transmitting apparatus comprising: an idle gear provided on the first gear supporting frame to connect to the first gear train; a swing arm in a V-configuration, coaxially formed with the idle gear and rotatable

about the idle gear; a pair of swing gears rotatably formed on both ends of the swing arm, and selectively connected with the second gear train when the gear arm rotates.

According to the preferred embodiment of the present invention, the swing arm comprises: a V-shaped body having a shaft hole in the center through which a supporting shaft of the idle gear is engaged; an engaging protrusion extending from both ends of the body to rotatably support the swing gear.

The engaging protrusion is cut off a predetermined width with respect to the center, and has one end chamfered in the direction where the swing gear is inserted and the other end having a stepped separation preventing protrusion.

An elastic member may be also provided between the swing gear and the swing arm, to push the swing gear to a close contact with the swing arm to prevent undesired movement of the swing gear.

The elastic member is a plate spring which is coaxially engaged with the swing gear.

The preferred embodiments of the present invention will be explained below with reference to the accompanying drawings. In describing a power transmitting apparatus according to the present invention, the like elements with similar effect and operation will be given the same reference numerals throughout.

FIGS. 2 and 3 are perspective views showing the embodiments of the present invention employed to a power transmitting apparatus of a multi-function unit. FIG. 4 is an exploded perspective view of the structure of the present invention, and FIGS. 5 and 6 are side view showing the operational status of the present invention.

With reference to FIGS. 2 through 4, the power transmitting apparatus 100 according to the present invention includes a swing arm 10, an idle gear 20 and a pair of swing gears 30.

The swing arm 10 is rotatably formed on the first gear supporting frame 4 to be connected with the first gear train 6, and rotate together with the idle gear 20. The swing arm 10 has a V-shaped body, with both ends being each provided with swing gear engaging protrusions 11.

The engaging protrusions 11 each have swing gears 31, 33, and by the swing gears 31, 33, power is transmitted to the gear train 7 on the second gear supporting frame 5.

One ends of the engaging protrusions 11 are chamfered in a direction corresponding

to the inserting of the swing gears 31, 33, and the other ends are provided with separation preventing protrusions 12.

The separation preventing protrusions 12 according to the embodiment of the present invention are formed by cutting off a predetermined width of the middle part of the engaging protrusions 11, and the separation preventing protrusions 12 are elastically deformed according to the inserting/engaging of the swing gears 30.

The engaging protrusions 11 are provided with an elastic member 40 which elastically support the swing gears 31, 33, to tight contact with the swing arm 10. The elastic member 40 may preferably be a plate spring having a donut-shaped body. By the elastic member 40, the undesired movement of the swing gears 31, 33 during the power transmission, can be prevented.

Reference numeral 8 of FIG. 2 refers to a feeding unit formed on the first gear train 6, and 9 is a scanning unit formed on the second gear train 7. Also, the reference numeral 6' of FIGS. 3, 5 and 6 is a power transmitting gear transmitting the power of the driving motor 1, and 7' is a first connecting gear of the second gear train formed on the second gear supporting frame 5. Accordingly, the feeding unit 8 and the scanning unit 9 are operated by the driving power of the driving motor 1 and distributed by the power transmitting gear 6'.

The operation of the present invention will now be explained with reference to the accompanying drawings.

FIGS. 5 and 6 show the power transmitting apparatus 100, employed in a multi-function unit as an office automation device, operating according to the rotation of the driving motor in forward and backward directions.

When the driving motor 1 starts operation and the motor gear 2 is rotated in the forward direction, the power transmitting gear 6' connected with the motor gear 2, and the idle gear 20 are teeth-engaged with each other and rotated. At this time, by the moment

generating due to the rotation of the idle gear 20, the swing arm 10 is rotated counterclockwise.

As the swing arm 10 rotated counter-clockwise, the swing gear 31 engaged with the end of the swing arm 10 contacts the first gear 7' of the second gear train and rotated. At this time, the swing arm 10 is rotated until it contacts the first gear 7' of the second gear train such that the swing gear 31 and the first gear 7' of the second gear train are smoothly connected, and thus, even when the distance d varies between axes of the first gear supporting frame 4 and the second gear supporting frame 5 due to assembling tolerance, power from the idle gear 20 can be transmitted to the second gear train 7, while problems such as escape of power transmitting parts, gear wearing-outs and deteriorated transmission efficiency are prevented. Accordingly, the second gear train 7, receiving the power according to the above processes, can drive the scanning unit 9 (FIG. 2).

Meanwhile, when the driving motor 1 starts driving and rotates the motor gear 2 in reverse direction, the idle gear 20 connected with the motor gear 2 is teeth-engaged with the motor gear 2. At this time, by the moment generated due to the rotation of the swing gear 33, the swing arm 10 is rotated clockwise, and by the same processes explained above, the swing gear 33 is connected with the first gear 7' of the second gear train.

[Effect of the invention]

With a power transmitting apparatus according to the present invention, even when the assembling tolerance occurs between the gear supporting frames, the tolerance can be offset by the swing gear provided to the swing arm. Accordingly, problems associated with irregular distance between axes, such as escape of power transmitting parts, gear wearing-outs and deteriorated transmission efficiency, can be prevented.

Although the preferred embodiment of the present invention has been described, it will be understood by those skilled in the art that the present invention should not be limited to the described preferred embodiment, but various exchanges and modifications can be made within the spirit and the scope of the present invention. Accordingly, the scope of the present invention is not limited within the described range but the following claims.

Claims

1. A power transmitting apparatus connecting a first gear trams provided on a first gear supporting frame, and a second gear train provided on a second gear supporting frame neighboring the first supporting frame, the power transmitting apparatus comprising:

an idle gear provided on the first gear supporting frame to connect to the first gear train;

a swing arm in a V-configuration, coaxially formed with the idle gear and rotatable about the idle gear;

a pair of swing gears rotatably formed on both ends of the swing arm, and selectively connected with the second gear train when the gear arm rotates.

2. The power transmitting apparatus of claim 1, wherein the swing arm comprises:

a V-shaped body having a shaft hole in the center through which a supporting shaft of the idle gear is engaged;

an engaging protrusion extending from both ends of the body to rotatably support the swing gear.

3. The power transmitting apparatus of claim 2, wherein the engaging protrusion is cut off a predetermined width with respect to the center, and has one end chamfered in the direction where the swing gear is inserted and the other end having a stepped separation preventing protrusion.

4. The power transmitting apparatus of claim 1, further comprising an elastic member formed between the swing gear and the swing arm, to push the swing gear to a close contact with the swing arm to prevent undesired movement of the swing gear.

5. The power transmitting apparatus of claim 4, wherein the elastic member is a plate spring which is coaxially engaged with the swing gear.